devised by BRIGGS and SHANTZ to express the wilting coefficient in terms of soil composition is capable of simple modification for higher rates of transpiration. As there seems to be no reason at all to doubt the experimental accuracy of the work of BRIGGS and SHANTZ, especially when their extensive character is taken into consideration, the second of these problems would seem to offer a favorable field for further experimentation, with a strong probability of results that would be useful in many phases of ecological study. Indeed, the most recent paper upon the subject by SHIVE and LIVINGSTON[5] makes an unsuccessful attempt at a determination of the limits within which the formula of BRIGGS and SHANTZ does apply. It confirms the results of CALDWELL, further emphasis being given to the fact that for the soils of high water-holding powers the wilting coefficient, or the "soil moisture residue at permanent wilting" as SHIVE and LIVINGSTON prefer to call it, even with high evaporating power of the air, is but little above, in fact, in some instances, is slightly below that obtained by the direct methods of BRIGGS and SHANTZ. This paper also contains an attempt to express by an algebraic equation the relation of the wilting coefficient to the evaporation intensity under which wilting was brought about, but the results are so diverse that only a rather wide approximation is obtained. The general conclusion seems to be that the formula of BRIGGS and SHANTZ holds within certain limits, as yet undetermined, but doubtless within atmospheric conditions of comparatively low evaporation intensity.—GEO. D. FULLER.

Ecology of fresh-water algae.—COMERE[6] has published a general account of the ecology of the fresh-water algae. The paper itself is so nearly a summary of the results of investigations by the author and other European limnologists, that it is difficult to condense the matter further. The paper is divided in three parts, the first of which considers the classification and nomenclature of aquatic formations, the separation of these formations into characteristic regions, and the arrangement and terminology of the "florules" corresponding to these regions. This part is especially useful because of its concise definitions and citations of synonyms. Algal habitats are primarily divided into aquatic and subaerial. The former are further separated into permanent and transient groups. The algal formations are first divided into those of large lakes, small lakes, and streams. In these there may be further recognized the littoral, planctonic, and bottom regions, each with its corresponding florule. The subdivisions are too numerous to mention here, but this will suffice to show that

[5] SHIVE, J. W., and LIVINGSTON, B. E., The relation of atmospheric evaporating power to soil moisture content at permanent wilting in plants. Plant World **7**:81–121. 1914.

[6] COMERE, JOSEPH, De l'action du milieu considérée dans ses rapports avec la distribution générale des Algues d'eau douce. Mém. 25, Bull. Soc. Bot. France **16**: 1–96. 1913.

the basis of classification is essentially static, and ignores the genetic relationships of both the habitats and the formations. Consequently, proximity in the resulting scheme of classification does not necessarily imply near relationship, nor wide separation a lack of connection.

The second part contains a summary of observations on the influence of the various ecological factors. These include the usual factors classified as climatic, physical and chemical, and biotic.

The means of dispersal, the geographic distribution of the various families of algae, the algal populations of various formations, and the periodicity of the algal flora form the topics of the last division of the memoir. The discussion of periodicity is largely drawn from COMERE'S previous paper on this subject. The division of the algal flora into vernal, estival, autumnal, and hyemal groups, it should be noted, is really a characterization of the seasons by means of algal reproduction, rather than a classification of algae on the basis of their seasonal phenomena. With regard to the concentration of natural waters, the usual assumption is made that there exists an inverse relation between the height of the water level and the concentration. This leaves out of account the removal of solutes by the adsorption and subsequent settling of the solid particles in these waters, which it seems is much more important in determining concentration than changes in volume. But these points to which exception may be taken are few compared with the great number of topics discussed. —E. N. TRANSEAU.

British North Borneo.—Miss GIBBS[7] has published a notable contribution dealing with the flora of North Borneo. The first part deals with the ecological features of a most interesting region. The general character of the country is discussed, as to its orography and meteorology, and also the general plant-formations under the titles "secondary formations" and "primary forest." A very full itinerary makes the aspects of the flora vivid; and there is a special description of the plant formations on Mt. Kinabalu, the highest mountain of the Malay Archipelago, which was first ascended in 1851 by a botanist, Sir HUGH LOW, then colonial secretary of Labuan.

In the systematic account (184 pp.) of the remarkably large collection of plants made in January to March 1910, Miss GIBBS has had the assistance of several specialists. The collections include plants of all groups from algae to seed plants. Descriptions of about 85 new species, well distributed throughout the families of seed plants, are published, including the following new genera: *Phyllocrater* and *Cowiea* (Rubiaceae), *Sigmatochilus* (Orchidaceae), and *Lophoschoenus* (Cyperaceae). As might be expected, Orchidaceae secure the largest representation of new species, 21 in number. *Elatostema* illustrates how a

[7] GIBBS, LILIAN S., A contribution to the flora and plant formations of Mount Kinabalu and the Highlands of British North Borneo. Jour. Linn. Soc. Bot. **42**: 1–240. *figs. 8. pls. 1–8.* 1914.